

Problem J. Hiking Trip

Input file: standard input
Output file: standard output
Time limit: 4 seconds
Memory limit: 2048 megabytes

Una and Kamome plans to go hiking in the suburb of Guangzhou.

There are n views from west to east in the mountain, numbered from 1 to n . The i -th view has an altitude h_i . Una decides to choose an interval $[l, r]$ ($1 \leq l \leq r \leq n$) and travel from the l -th view to the r -th view.

However, Una dislike valleys, so she doesn't want any $l < i < r$ to be a valley, that is, $h_{i-1} > h_i < h_{i+1}$. At the same time, she thinks that flat roads are boring, so she hopes that for all $l \leq i < r$, $h_i \neq h_{i+1}$. Una will enjoy the trip if the interval $[l, r]$ satisfies these two conditions.

Kamome made some research before the hiking trip and find out the altitudes of some of the views. She wants to know that if the altitudes of all the other views are independent random integers in $[1, m]$, how many different intervals $[l, r]$ can be chosen to help Una enjoy the trip. Help Kamome find the expected value, modulo $10^9 + 7$.

Input

Each test contains multiple test cases. The first line contains one integer t ($1 \leq t \leq 10^5$), indicating the number of test cases. The description of the test cases follows.

The first line contains two integers n, m ($1 \leq n \leq 10^6$, $\sum n \leq 10^7$, $1 \leq m \leq 10^9$), indicating number of views in the mountain and the altitude range.

The second line contains n integers h_1, h_2, \dots, h_n ($1 \leq h_i \leq m$ or $h_i = -1$), indicating the result of the research Kamome made. If $h_i \neq -1$, h_i means the actual altitude of view i . Otherwise, it means that Kamome didn't find any information about the altitude of view i and regard it as a random integer in $[1, m]$.

Output

For each test case, print one integer, indicating the expected number of intervals $[l, r]$ such that Una is enjoyed, modulo $10^9 + 7$.

Examples

standard input	standard output
10	8
4 4	666666676
1 4 2 3	875000012
3 3	555555566
-1 2 -1	872000016
4 2	750000017
-1 -1 -1 1	400000014
4 3	554687520
1 -1 -1 3	973046972
5 5	216066617
-1 2 -1 4 -1	
6 4	
2 -1 1 -1 -1 1	
5 5	
1 -1 4 -1 1	
8 4	
-1 2 -1 -1 2 -1 4 -1	
9 7	
4 -1 2 -1 -1 6 -1 4 -1	
20 20	
-1 -1 -1 5 -1 -1 13 -1 10 -1 -1 -1 -1	
12 -1 3 -1 -1 -1 18	

Note

For the first test case, Una enjoys the trip if she chooses intervals $[1, 1]$, $[2, 2]$, $[3, 3]$, $[4, 4]$, $[1, 2]$, $[2, 3]$, $[3, 4]$ or $[1, 3]$.

For the second test case, the answer is $\frac{14}{3}$.